# *Appendix G5*
# *Air Quality - Air Quality Analysis of Construction Emissions - Criteria Air Pollutants*

## *G5-1 Localized Significance Threshold (LST) Analysis of Criteria Air Pollutants - Onshore Construction Activities in Los Angeles County*
## *G5-2 Air Quality Analysis for Criteria Pollutants - Offshore and Onshore Construction*

***AVAILABLE ON CD ONLY***

# Appendix G5-1

## Localized Significance Threshold (LST) Analysis of Criteria Air Pollutants

## Onshore Construction Activities in Los Angeles County

## Cabrillo Port LNG Deepwater Port Project

## 1. INTRODUCTION

The objective of this analysis was to compare criteria air pollutant emissions from onshore construction activities that would occur in Los Angeles County to Localized Significance Threshold (LST) screening tables as prescribed in the South Coast Air Quality Management District's *Localized Significance Threshold Methodology* (SCAQMD 2003) and *Methodology to Calculate Particulate Matter ($PM_{2.5}$) and $PM_{2.5}$ Significance Thresholds* (SCAQMD 2006). The analysis included evaluation of the following criteria air pollutants:

- carbon monoxide (CO);
- nitrogen dioxide ($NO_2$);
- particulate matter less than or equal to 10 microns ($PM_{10}$); and
- particulate matter less than or equal to 10 microns ($PM_{2.5}$).

## 2. LOCATION

The installation of the Line 225 Pipeline Loop in Los Angeles County would occur along a 7-mile corridor between Newhall and Santa Clarita. Construction would occur within Source Receptor Area (SRA) No. 13: Santa Clarita Valley.

## 3. EMISSION SOURCES

Pipeline installation would include the following construction activities: trenching, pipelay, and drilling. Trenching and pipelay would progress along the 7-mile pipeline corridor, and, thus represent "moving" construction sites. Drilling would occur at several locations, with the duration of construction at each location expected to vary.

This analysis is based construction equipment emissions as proposed by the Applicant. A summary of equipment and the calculations used to estimate maximum daily emissions for each of these construction activities is included in Appendix G1-1 of the Final EIS/EIR. Maximum daily emissions are also summarized in Table 1. This table only includes $PM_{10}$ and $PM_{2.5}$ emissions in the construction site area (i.e., no off-site fugitive dust emissions).

For purposes of this analysis, all pipelay equipment was assumed to operate in a 30 meter x 200 meter area (~1.5 acres); all trenching equipment was assumed to operate in a 30 meter x 200 meter area (~1.5 acres); all drilling equipment was assumed to operate in a 75 meter x 75 meter area (~1.5 acres).

## 4. RECEPTORS

The Line 225 Pipeline Loop would traverse through many different agricultural, residential, and commercial areas. For purposes of this analysis, the minimum distance to a receptor was assumed to be 25 meters.

## 5. RESULTS

A comparison of maximum daily emissions from each construction activity to LST screening levels is presented in Table 1. The analysis indicates that $NO_x$, $PM_{10}$, and $PM_{2.5}$ emissions from each construction activity would exceed significance thresholds. The analysis further indicates that CO emissions from pipelay construction activities would also exceed significance thresholds. Based on these results, a more refined air quality analysis was conducted to estimate potential air quality impacts for each of these pollutants (see Appendix G5-2 of the Final EIS/EIR).

## 6. REFERENCES

South Coast Air Quality Management District (SCAQMD). 2003. Final Localized Significance Threshold Methodology. June.

_______________. 2006. Methodology to Calculate Particulate Matter ($PM_{2.5}$) and $PM_{2.5}$ Significance Thresholds. October.

**Table 1: Comparison of Maximum Daily Emissions to Significance Threshold Allowable Emissions**

| Pollutant | Maximum Daily Emissions (lb/day) | | | Significance Threshold Allowable Emissions [Receptor Distance of 25 meters & 1.5 acre Site][a] (lb/day) |
|---|---|---|---|---|
| | Pipelay | Trenching | Drilling | |
| CO | 979 | 179 | 347 | 523 |
| $NO_2$ | 187 | 193 | 616 | 178 |
| $PM_{10}$ | 25 | 21 | 28 | 1 |
| $PM_{2.5}$ | 14 | 14 | 25 | 1 |

Notes:

a. Allowable emissions for 1.5 acre site interpolated from allowable emissions listed for 1 and 2 acre sites

(Sources: SCAQMD 2003 and SCAQMD 2006)

# Appendix G5-2

# Air Quality Analysis for Criteria Pollutants

# Offshore and Onshore Construction

# Cabrillo Port LNG Deepwater Port Project

## 1. INTRODUCTION

The objective of the air quality analysis was to evaluate the potential air quality impacts due to the emissions from onshore and offshore Project construction activities of the following criteria pollutants:

- carbon monoxide (CO);
- nitrogen dioxide ($NO_2$);
- particulate matter less than or equal to 10 microns ($PM_{10}$);
- particulate matter less than or equal to 2.5 microns ($PM_{2.5}$); and
- sulfur dioxide ($SO_2$).

Due to the transient nature of construction activities and limited duration at any one location, the air quality analysis predicted short-term impacts but not long-term (annual) impacts.

## 2. METHODOLOGY

Air quality impacts associated with onshore construction activities were evaluated using the United States Environmental Protection Agency's (USEPA's) Industrial Source Complex-Short Term Model (ISCST3). ISCT3 was run under the regulatory default option. Air quality impacts associated with offshore construction activities were evaluated using the Offshore Coastal and Dispersion model (OCD). OCD was developed by the Minerals Management Service (MMS) and is approved for overwater emission sources by USEPA. Potential air quality impacts were compared to appropriate National Ambient Air Quality Standards (NAAQS), State Ambient Air Quality Standards (SAAQS), and, as applicable, local air district significance thresholds.

## 3. DISPERSION MODEL INPUTS

### 3.1 Source Descriptions

Air quality impacts of criteria air pollutants were evaluated for the following onshore and offshore construction activities:

- Installation of the Center Road Pipeline in Ventura County, including:
  - trenching
  - pipelay
  - boring
- Installation of the Line 225 Pipeline Loop in Los Angeles County, including:
  - trenching
  - pipelay
  - drilling
- Pipeline Shore Crossing Point Construction at Ormond Beach in Ventura County, including:
  - onshore horizontal directional boring (HDB)
  - offshore vessel operation
- Installation of Offshore Pipeline in Federal Waters and Ventura County Waters

- Installation of FSRU/Mooring in Federal Waters

Trenching and pipelay would progress over pipeline routes of approximately 14 miles in Ventura County and approximately 7 miles in Los Angeles County. Thus, trenching and pipelay represent "moving" construction sites. Drilling and boring operations would occur at several locations along the pipeline routes in Los Angeles County and Ventura County, respectively, with the duration of construction at each location expected to vary. These onshore activities could occur simultaneously in time but would happen at different locations along the pipeline route.

Shore crossing construction at Ormond Beach is expected to occur over a period of approximately 60 days. Offshore pipeline installation would traverse a distance of approximately 18 miles over a period of 35 days. FSRU/Mooring installation would occur at the proposed FSRU location for a period of 24 days.

During onshore construction activities, air pollutants would be emitted from the equipment engines and as fugitive dust from equipment/vehicle operation. During offshore construction activities, air pollutants would be emitted from equipment and/or vessel engines.

A summary of the construction equipment associated with each activity is presented in Appendix G1-1 of the Final EIS/EIR.

### 3.2 Emission Rates

#### 3.2.1 Emission Rates – As Proposed by Applicant

The analysis was conducted using equipment emission rates based on the Project as proposed by the Applicant. Daily emissions of oxides of nitrogen ($NO_x$), $SO_2$, CO, $PM_{10}$, and $PM_{2.5}$ during Project construction are summarized in Appendix G1-1 of the Final EIS/EIR. These daily emissions were converted to emission rates in terms of pounds per hour (lb/hr) and grams per second (g/s) using the reported hours of daily operation of each construction activity. A summary of air pollutant emission rates for each equipment/vessel, as well as fugitive dust emissions, are presented in Tables 14 through 20 of Appendix G1-1 of the Final EIS/EIR.

An evaluation of required mitigation measures that would reduce emissions is discussed in Section 7 of this analysis.

### 3.3 Source Parameters

For purposes of this analysis, the construction zone associated with trenching and pipelay activities during onshore pipeline installation was defined by a rectangular area with dimensions of 200 meters by 30 meters representative of a small portion of the pipeline corridor. The construction zone associated with boring, drilling, and shore crossing HDB scenarios was defined as a square area with dimensions of 75 meters by 75 meters representative of a drilling area. As construction moves along the corridor, the ambient air quality impacts resulting from emissions in the representative area move with the construction activity and would only occur at a specific location for a limited amount of time.

#### 3.3.1 Equipment and Vessel Engines (Point Sources)

Each individual construction equipment (or vessel) was input as a point source into ISCST3 or OCD. The exhaust flow rate of each device was derived from the listed engine size and operating load. Stack height, exit diameter, and exit temperature were estimated for typical equipment. Stack parameters used for point sources are summarized in Tables 14 through 20 of Appendix G1-1 of the Final EIS/EIR.

For onshore construction activities, individual equipment locations were placed at representative locations within each construction area. For offshore pipelay and offshore crossing support vessel operations, equipment was placed at the offshore exit point of shore crossing HDB, which is the closet point to shore. However, offshore pipelay would only occur at this point for a limited time as the offshore pipelay would traverse distances equivalent of approximately one kilometer per day, starting at the proposed FSRU location. For offshore mooring/FSRU installation, equipment was placed at the proposed FSRU location.

### 3.3.2 Fugitive Dust (Area Sources)

Since fugitive dust could be generated from equipment and vehicle operation within a specified construction zone during onshore construction activity, ambient impacts from these emissions were also modeled. Fugitive dust emissions from these construction zones were evaluated as area sources that corresponded to the construction area sizes described above.

## 3.4 Land Use Dispersion Options

ISCST3 runs for onshore construction activities were performed with the "Urban" dispersion option.

## 3.5 Receptors

For all onshore activities except shore crossing HDB, a receptor grid was generated that extended up to 1,000 meters from the edge of the proposed construction areas. Receptor spacing was 25 meters up to a distance of 100 meters from the construction area; 50 meters between 100 meters and 200 meters from the construction area; and 100 meters beyond 200 meters from the construction area.

For shore crossing construction, the combined impacts from onshore HDB equipment and offshore vessels were considered. Thus, a receptor grid was generated that included all shore-based receptors that were located within 1,600 meters of the edge of the proposed onshore construction area and within 3,000 meters of the proposed offshore vessel operations. This receptor grid was based on receptor locations as presented in *California Environmental Quality Act Air Quality Impact Assessment of the BHP Cabrillo Deepwater Port LNG Import Terminal* (Sierra Research 2006). Receptor spacing was 100 meters.

For FSRU/Mooring installation, impacts were evaluated at onshore locations in a receptor grid extending two miles inland from the shoreline between Oxnard and Malibu. The onshore receptor grid matched the onshore receptor grid for this area presented in *California Environmental Quality Act Air Quality Impact Assessment of the BHP Cabrillo Deepwater Port LNG Import Terminal* (Sierra Research 2006). Receptor spacing was 100 meters.

## 3.6 Meteorological Data

The ISCST3 model was run with one year of meteorological data that corresponds to the location of each construction activity. For activities that would occur in Ventura County, data from the El Rio Meteorological Station (Year 1991) was used. For activities that would occur in Los Angeles County, data from the Newhall Meteorological Station (Year 1981) was used. A summary of data used is presented below:

- Ventura County (El Rio, 1991)
    - Trenching
    - Pipelay
    - Boring
    - ShoreHDB
- Los Angeles County (Newhall, 1981)
    - Trenching
    - Pipelay
    - Drilling

The OCD model was run with one year (Calendar Year 2000) of meteorological data from Buoy Station 46025. The Calendar Year 2000 overland and overwater meteorological data sets used were identical to those described in *California Environmental Quality Act Air Quality Impact Assessment of the BHP Cabrillo Deepwater Port LNG Import Terminal* (Sierra Research 2006).

## 4. $NO_2$ to $NO_x$ Ratio

Combustion processes occurring from equipment yield $NO_x$ emissions. The two principal $NO_x$ species are nitric oxide (NO) and $NO_2$, with the vast majority (95 percent) of the $NO_x$ emissions comprised of NO. Adverse health effects are associated with $NO_2$, not NO. NO is converted to $NO_2$ by several processes. The two most important of these are (1) the reaction of NO with ozone and (2) the photochemical reaction of NO with hydrocarbon radical species. Destruction of $NO_2$ occurs with its photodissociation into NO and molecular oxygen (SCAQMD 2003).

Following discussion outlined in *Final Localized Significance Threshold Methodology* (SCAQMD 2003), $NO_x$ emissions were modeled in ISCST3 and OCD with the $NO_2$ conversion rate treated by an $NO_2$-to-$NO_x$ ratio, which is a function of downwind distance. Initially, it is assumed that only 5% of the emitted $NO_x$ is $NO_2$ and 95% of the emitted NOx is NO. At 5,000 meters downwind, the conversion of NO to $NO_2$ is assumed to 100%. The assumed $NO_2$-to-$NO_x$ ratios between those distances are presented in Figure 1. SCAQMD adapted these $NO_2$ conversion rates from work by Arellano et al. A tabular summary of the $NO_2$-to-$NO_x$ ratios by downwind distance is presented in Table 1.

Since the impacts were predicted for several pieces of equipment operating at different distances from receptors, the $NO_2$-to-$NO_x$ ratio was applied based on the largest distance from any source to each receptor. This approach ensured a conservative estimation of $NO_2$ impacts as the $NO_2$-to-$NO_x$ ratio increases with distance.

## 5. RESULTS

Potential air quality impacts were estimated by adding the maximum ambient concentrations predicted (for each appropriate averaging time) to the corresponding background concentration. The potential air quality impact was then compared to appropriate NAAQS and SAAQS. Summaries of the air quality impacts and comparison NAAQS and SAAQS are presented in the following tables.

Table 2: Onshore Pipeline Installation in Ventura County
Table 3: Onshore Pipeline Installation in Los Angeles County

Table 4: Shore Crossing Construction and Offshore Construction Activities

A comparison of particulate matter impacts due to equipment exhaust and fugitive dust is presented in Table 5. Impacts for $PM_{10}$ are also compared to SCAQMD significance thresholds.

## 6. DISCUSSION

The analysis indicated that emissions from onshore pipelaying activities could contribute to exceedences of NAAQS and SAAQS for CO. These potential exceedences were predicted at locations located within 82 feet (25 meters) of the onshore pipelay construction activity corridor and are attributed primarily to gasoline-fueled construction equipment. The analysis also indicates that $NO_x$ emissions generated from shore crossing construction could contribute to exceedences of SAAQS for $NO_2$. The $NO_2$ impacts predicted due to $NO_x$ emissions generated from onshore pipelay and offshore pipelay construction were just below the SAAQS. Maximum ambient CO and $NO_2$ impacts predicted for all other construction activities were less than the applicable NAAQS and SAAQS.

The analysis indicates that potential increases in ambient $PM_{10}$ and $PM_{2.5}$ concentrations caused by onshore construction emissions could contribute to exceedences of NAAQS and SAAQS. The majority of $PM_{10}$/$PM_{2.5}$ impacts can be attributed to fugitive dust generated during construction activities. Due to the difficulty associated with estimating fugitive dust emissions and with trying to replicate sources of fugitive dust within dispersion models, a high level of uncertainty should be assigned to the impacts predicted from fugitive dust emissions.

Onshore construction activities as modeled assume that all construction equipment would be operated simultaneously. This is a very conservative assumption as it is highly unlikely that this situation would ever take place, especially for pipelay and trenching operations. Onshore pipeline installation would more likely occur with less equipment at a single location and spread out over much greater distances. Thus, the maximum short-term ambient concentrations predicted during this analysis are deemed to be very conservative in representing potential impacts.

## 7. MITIGATION

Section 4.6.4 of the Final EIS/EIR outlines required mitigation measures for construction equipment. These mitigation measures included requirements for diesel-fueled equipment fitted with Tier 3 engines and gasoline-fueled equipment fitted with engines compliant with California emission standards. Revised emission calculations based on these mitigation measures are presented in Appendix G1-2 of the Final EIS/EIR.

A limited number of additional model runs were performed to assess the effect of lowered emission rates due to these required mitigation measures. These model runs were performed only for those activities (and pollutants) that showed an exceedence of NAAQS and/or SAAQS prior to mitigation:

- Shore Crossing HDB ($NO_2$)
- Onshore Pipelay (CO)

Table 6 summarizes $NO_2$ impacts due to shore crossing construction with application of mitigation measures. Table 7 summarizes CO impacts due to onshore pipelay activities with application of mitigation measures. These results indicate that mitigation measures would reduce emissions so that air quality impacts would be less than applicable SAAQS and/or NAAQS.

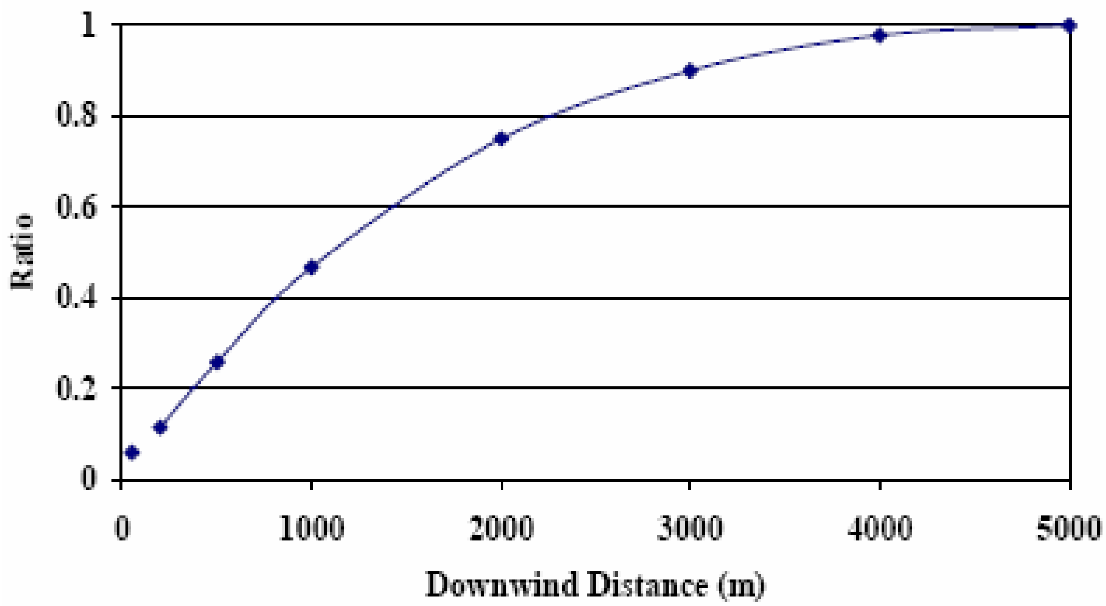
## 8. REFERENCES


Arellano, J.V., A.M. Talmon, and P.J.H. Builtjes, "A Chemically Reactive Plume Model for the NO-$NO_2$-$O_3$ System," *Atmospheric Environment* **24A**, 2237-2246

Sierra Research. 2006. California Environmental Quality Act Air Quality Impact Assessment of the BHP Cabrillo Deepwater Port LNG Import Terminal. October 5.

South Coast Air Quality Management District (SCAQMD). 2003. Final Localized Significance Threshold Methodology. June.

**Figure 1. $NO_2$-to-$NO_x$ Ratio as a Function of Downwind Distance**




Source: Final Localized Significance Threshold Methodology *(SCAQMD 2003)*

**Table 1**
**$NO_2$-to-$NO_x$ Ratio as a Function of Downwind Distance**
**Cabrillo Port LNG Deepwater Port**

| Downwind Distance (m) | $NO_2$-to-$NO_x$ Ratio |
|---|---|
| 20 | 0.053 |
| 50 | 0.059 |
| 70 | 0.064 |
| 100 | 0.074 |
| 200 | 0.114 |
| 300 | 0.163 |
| 400 | 0.212 |
| 500 | 0.258 |
| 600 | 0.302 |
| 700 | 0.344 |
| 800 | 0.385 |
| 900 | 0.425 |
| 1000 | 0.467 |
| 1500 | 0.621 |
| 2000 | 0.75 |
| 3000 | 0.9 |
| 3200 | 0.92 |
| 4000 | 0.978 |
| 5000 | 1 |

**Table 2**
**Summary of Air Quality Impacts - Onshore Pipeline Installation - Ventura County**
**Cabrillo Port LNG Deepwater Port**

| Pollutant | Avg Period | Modeled Impact ($\mu g/m^3$) | | | Background Concentration[a] ($\mu g/m^3$) | Total Impact ($\mu g/m^3$) | | | SAAQS ($\mu g/m^3$) | NAAQS ($\mu g/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Pipelay | Trenching | Boring | | Pipelay | Trenching | Boring | | |
| $NO_2$[b] | 1-hr | 231 | 71 | 78 | 139 | 370 | 210 | 217 | 470 | - |
| $SO_2$ | 1-hr | 18 | 3.2 | 0.88 | 39 | 57 | 42 | 40 | 655 | - |
| | 3-hr | 12 | 2.8 | 0.82 | 35 | 47 | 38 | 36 | - | 1,300 |
| | 24-hr | 5.6 | 0.95 | 0.39 | 24 | 30 | 25 | 24 | 105 | 365 |
| CO | 1-hr | 15,100 | 2,800 | 487 | 8,243 | 23,343 | 11,043 | 8,730 | 23,000 | 40,000 |
| | 8-hr | 7390 | 1440 | 296 | 4,007 | 11,397 | 5,447 | 4,303 | 10,000 | 10,000 |
| $PM_{10}$ | 24-hr | 185 | 109 | 58 | 124 | 309 | 233 | 182 | 50 | 150 |
| $PM_{2.5}$ | 24-hr | 82 | 55 | 29 | 82 | 164 | 137 | 111 | - | 35 |

Notes:

a. Background concentrations based on maximum concentration observed at El Rio Monitoring Station between 2000 and 2004.

b. Modeled impacts for $NO_2$ incorporate $NO_2$-to-$NO_x$ ratio.

**Table 3**
**Summary of Air Quality Impacts - Onshore Pipeline Installation - Los Angeles County**
**Cabrillo Port LNG Deepwater Port**

| Pollutant | Avg Period | Modeled Impact ($\mu g/m^3$) | | | Background Concentration[a] ($\mu g/m^3$) | Total Impact ($\mu g/m^3$) | | | SAAQS ($\mu g/m^3$) | NAAQS ($\mu g/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Pipelay | Trenching | Drilling | | Pipelay | Trenching | Drilling | | |
| $NO_2$[b] | 1-hr | 236 | 69 | 166 | 226 | 462 | 295 | 392 | 470 | - |
| $SO_2$ | 1-hr | 18 | 3.3 | 1.5 | 446 | 464 | 449 | 448 | 655 | - |
| | 3-hr | 14 | 2.8 | 1.3 | 446 | 460 | 449 | 447 | - | 1,300 |
| | 24-hr | 4.9 | 0.98 | 0.62 | 45 | 50 | 46 | 46 | 105 | 365 |
| CO | 1-hr | 15,200 | 2,830 | 774 | 6,900 | 22,100 | 9,730 | 7,674 | 23,000 | 40,000 |
| | 8-hr | 7,830 | 1,940 | 572 | 5,625 | 13,455 | 7,565 | 6,197 | 10,000 | 10,000 |
| $PM_{10}$ | 24-hr | 233 | 138 | 73 | 64 | 297 | 202 | 137 | 50 | 150 |
| $PM_{2.5}$ | 24-hr | 100 | 69 | 38 | 73 | 173 | 142 | 111 | - | 35 |

Notes:

a. Background concentrations for CO based on maximum concentrations observed at Santa Clarita Valley station between 2000 and 2005.
Background concentrations for $SO_2$ based on maximum concentrations observed at all Los Angeles County stations between 2000 and 2005.
Background concentrations for $NO_2$ and $PM_{10}$ based on maximum concentration observed at Santa Clarita Valley station between 2000 and 2004.
Background concentration for $PM_{2.5}$ based on maximum concentration observed at West San Fernando Valley station between 2000 and 2004.

b. Modeled impacts for $NO_2$ incorporate $NO_2$-to-$NO_x$ ratio.

**Table 4**
**Summary of Air Quality Impacts - Shore Crossing and Offshore Construction**
**Cabrillo Port LNG Deepwater Port**

| Pollutant | Avg Period | Modeled Impact (μg/m$^3$) | | | | | Background Concentration[a] (μg/m$^3$) | Total Impact (μg/m$^3$) | | | | | SAAQS (μg/m$^3$) | NAAQS (μg/m$^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Offshore Pipelay | Mooring | Shore Crossing | | | | Offshore Pipelay | Mooring | Shore Crossing | | | | |
| | | | | Vessels | ShoreHDB | TOTAL | | | | Vessels | ShoreHDB | TOTAL | | |
| $NO_2$[b] | 1-hr | 313 | 51 | 45 | 348 | 393 | 139 | 452 | 190 | - | - | 532 | 470 | - |
| $SO_2$ | 1-hr | 0.25 | 0.04 | 0.047 | 0.98 | 1.03 | 39 | 39 | 39 | - | - | 40 | 655 | - |
| | 3-hr | 0.17 | 0.01 | 0.038 | 0.89 | 0.93 | 35 | 35 | 35 | - | - | 36 | - | 1,300 |
| | 24-hr | 0.051 | 0.002 | 0.012 | 0.35 | 0.36 | 24 | 24 | 24 | - | - | 24 | 105 | 365 |
| CO | 1-hr | 434 | 63 | 86 | 503 | 589 | 8,243 | 8,677 | 8,306 | - | - | 8,832 | 23,000 | 40,000 |
| | 8-hr | 201 | 12 | 44 | 365 | 409 | 4,007 | 4,208 | 4,019 | - | - | 4,416 | 10,000 | 10,000 |
| $PM_{10}$ | 24-hr | 4.2 | 0.19 | 0.96 | 52 | 53 | 124 | 128 | 124 | - | - | 177 | 50 | 150 |
| $PM_{2.5}$ | 24-hr | 4.2 | 0.19 | 0.96 | 24 | 25 | 82 | 86 | 82 | - | - | 107 | - | 35 |

Notes:

a. Background concentrations based on maximum concentration observed at El Rio Monitoring Station between 2000 and 2004.

b. Modeled impacts for $NO_2$ incorporate $NO_2$-to-$NO_x$ ratio.

**Table 5**
**Comparison of $PM_{10}/PM_{2.5}$ Impacts**
**Cabrillo Port LNG Deepwater Port**

| County | Source Group | Maximum 24-hr $PM_{10}$ Impact ($\mu g/m^3$) | | | | | Maximum 24-hr $PM_{2.5}$ Impact ($\mu g/m^3$) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pipelay | Trenching | Boring | Drilling | ShoreHDB | Pipelay | Trenching | Boring | Drilling | ShoreHDB |
| Ventura | Equipment Exhuast | 8.1 | 4.0 | 10.7 | - | 4.8 | 8.1 | 4.0 | 10.7 | - | 4.8 |
| | FugitiveDust | 180 | 108 | 53 | - | 52 | 77 | 54 | 24 | - | 24 |
| | Overall | 185 | 109 | 58 | - | 52 | 82 | 55 | 29 | - | 24 |
| Los Angeles | Equipment Exhuast | 5.0 | 2.1 | - | 21 | - | 5.0 | 2.1 | - | 21 | - |
| | FugitiveDust | 232 | 138 | - | 67 | - | 100 | 69 | - | 31 | - |
| | Overall | 233 | 138 | - | 73 | - | 100 | 69 | - | 50 | - |
| SCAQMD Significance Criteria | - | 10.4 | 10.4 | 10.4 | 10.4 | 10.4 | - | - | - | - | - |

**Table 6**
**Summary of $NO_2$ Impacts with Mitigation - Shore Cossing**
**Cabrillo Port LNG Deepwater Port**

| County | Pollutant | Avg Period | Modeled Impact ($\mu g/m^3$) Shore Crossing Vessels | Modeled Impact ($\mu g/m^3$) Shore Crossing ShoreHDB | Modeled Impact ($\mu g/m^3$) Shore Crossing TOTAL | Background Concentration[a] ($\mu g/m^3$) | Total Impact ($\mu g/m^3$) Shore Crossing Vessels | Total Impact ($\mu g/m^3$) Shore Crossing ShoreHDB | Total Impact ($\mu g/m^3$) Shore Crossing TOTAL | SAAQS ($\mu g/m^3$) | NAAQS ($\mu g/m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ventura | $NO_2$[b] | 1-hr | 45 | 222 | 267 | 139 | - | - | 406 | 470 | - |

Notes:

a. Background concentrations based on maximum concentration observed at El Rio Monitoring Station between 2000 and 2004.

b. Modeled impacts for $NO_2$ incorporate $NO_2$-to-$NO_x$ ratio.

**Table 7**
**Summary of CO Impacts with Mitigation - Onshore Pipelay**
**Cabrillo Port LNG Deepwater Port**

| County | Pollutant | Avg Period | Modeled Impact ($\mu g/m^3$) Pipelay | Background Concentration[a,b] ($\mu g/m^3$) | Total Impact ($\mu g/m^3$) Pipelay | SAAQS ($\mu g/m^3$) | NAAQS ($\mu g/m^3$) |
|---|---|---|---|---|---|---|---|
| Ventura | CO | 1-hr | 5,050 | 8,243 | 13,293 | 23,000 | 40,000 |
| | | 8-hr | 2470 | 4,007 | 6,477 | 10,000 | 10,000 |
| Los Angeles | CO | 1-hr | 5,080 | 8,243 | 13,323 | 23,000 | 40,000 |
| | | 8-hr | 2550 | 4,007 | 6,557 | 10,000 | 10,000 |

Notes:

a. Ventura County background concentrations based on maximum concentration observed at El Rio Monitoring Station between 2000 and 2004.

b. For Los Angeles County:
Background concentrations for CO based on maximum concentrations observed at Santa Clarita Valley station between 2000 and 2005.